

REMARKS/ARGUMENTS

In response to the Office Action mailed February 10, 2006 Applicants amend their application and request reconsideration. In this Amendment, claims 1, 7, and 8 are cancelled and new claims 20-25 are added so that claims 2-6 and 9-25 are now pending.

In this Amendment the single original independent claim, claim 1, is cancelled in favor of newly submitted independent claims 20 and 21. In preparing new independent claims 20 and 21, some inadvertent errors in claim 1 have been removed and the language of claim 1 has been rearranged. Moreover, the limitations of claims 7 and 8, subject to clarification, have been respectively incorporated into claims 20 and 21.

Claim 20 encompasses what is designated as the first embodiment of the patent application. That embodiment is described with respect to Figures 1-5 of the patent application. Claim 21 encompasses what is designated as the third embodiment in the patent application, encompassing Figure 7, which is described in conjunction with Figures 1 and 3-5 of the patent application.

Examined claims 9 and 10 have been clarified and made dependent from claims 21 and 20, respectively. In view of the submission of claims 20 and 21, claims 9 and 10 have been revised to be consistent with those new independent claims. Claim 9 encompasses the embodiment of Figure 13 and claim 10 encompasses the embodiment of Figure 14, both discussed at pages 14 and 15 of the patent application. New claims 22, 23, 24, and 25 are copied from claims 6, 15, 18, and 19, respectively, but depend from claim 21 rather than claim 20.

In presenting new claims 20 and 21, those independent claims have been organized in a way to emphasize an important feature of the invention. As pointed out by the Examiner, the prior art recognizes the term "power cells", a term that is used in the present patent application. That term is used in new claims 20 and 21. Further, the structure of the respective power cells is described in claims 20 and 21. That structure has similarities to the power cells of the prior art. By adding this description of the power cells, the power cells are more clearly distinguished from the power units of the claimed invention. Those power units include not only power cells, but also an input transformer

group so that the power units comprise modules that can be identical in structure. Thus, a power converter is constructed by connecting together, in an appropriate way, a plurality of modular power units with each of the power units including an input transformer group. This simplification is a substantial improvement over the prior art where a variety of different structures are required for interconnection to produce the power converters that have been previously disclosed. According to the invention, using the modular power units, including respective transformers, the output voltage of a power converter can be increased or decreased simply by adding or removing power units without altering or affecting respective transformers. Further, due to the self-excitation elements of the power cells, besides supplying power from an AC power supply to an AC load, regenerative power from the AC load can be supplied to the AC power supply.

Claims 1-5, 7, 8, 11-14, 16, and 18 were rejected as anticipated by Aiello et al. (U.S. Patent 6,014,323, hereinafter Aiello). This rejection is not applicable to any claim now pending.

In applying Aiello, the Examiner directed attention to both Figures 1 and 1a of Aiello and to Figure 3 of Aiello. These figures are not compatible with each other and cannot be mixed and matched as done within the rejection. Figures 1 and 1a of Aiello relate to what Aiello describes as prior art whereas Figure 3 of Aiello pertains to what Aiello considers to be his improvement over the prior art. While there is some similarity of the interconnection of the power cells in the structures of Figures 1 and 3 of Aiello, the structures are different because the input transformers of Aiello are substantially different in those figures. Thus, in re-evaluating the rejection, in light of the newly submitted independent claims, each of the cited figures of Aiello must be considered separately, not in terms of some incompatible combination of those two different structures.

According to column 3 of Aiello, his Figure 1a shows a power cell of the device shown in Aiello's Figure 1. However, the structure of Figure 1a of Aiello and how it fits into the structure of Figure 1 of Aiello is not described in detail. The shift in reference numbers between those figures obscures whether the transformer 469 shown in Figure 1a is part of a respective power cell, for example, cell 12, of Figure 1 of Aiello, interfering with application of that disclosure to the invention presently claimed. Even if it is

assumed that the power cell 450 of Figure 1a of Aiello corresponds to the power cell 12 of Aiello, Aiello still cannot anticipate any claim now pending.

With regard to Figure 1 of Aiello, there is no indication that one of skill in the art would divide the transformer 2 into respective segments and incorporate those segments in the power cells 12-20, a step essential to meet the limitations of claims 20 and 21.

Figure 1 of Aiello, therefore, cannot anticipate any claim now pending.

In view of the impossibility of anticipation of claims 20 and 21 by Figure 1 of Aiello, one must turn to Figure 1a of Aiello to make a comparison to those claims. What is supplied to the transformer 469 in Figure 2 of Aiello is not apparent from the disclosure of that patent. Since all three phases are fed to each power cell according to Figure 1 of Aiello, apparently a three-phase input is supplied to the transformer 469 which, in turn, supplies respective phases to respective rectifiers. According to Aiello, as best understood, the power cell 450 includes a single such transformer, the winding structure of which apparently includes a three-phase primary and a three-phase secondary.

The power cell of Figure 1a of Aiello cannot correspond to the power unit of claims 20 and 21 because each of those power units includes multiple power cells, the number of power cells equaling the number of phases of the polyphase AC load. Each power cell of the invention includes a rectifier circuit, an inverter circuit, and a DC link circuit. While a single polyphase rectifier circuit, single phase inverter circuit, and a DC link circuit can be found within Figure 1a of Aiello, there are no multiple groups of such circuits constituting respective power cells within a single power unit driven by an input transformer group of that power cell. On this basis, Figure 1a of Aiello does not disclose a structure anticipating any pending claim. Likewise, if transformer 469 is a single transformer, it lacks a plurality of sets of secondary windings, preventing anticipation of claim 20. There is no suggestion that transformer 469 includes multiple transformers so that claim 21 cannot be anticipated. To the extent there may be a temptation to assert that the multiplication of parts, i.e., power cells, does not represent a patentable distinction, Applicants respectfully point out that Aiello suggests the single transformer 469 is part of a single power cell and never suggests a modular unit like the power unit of the claimed invention.

Turning next to the structure of Aiello's Figure 3, no power units corresponding to the power units of claims 20 and 21 can be found there. It may be tempting to divide the structure shown in Aiello's Figure 3 into three sections, each section including three power cells and one of transformers 41, 42, and 43, and to assert that the resulting structures correspond to power units of the claims. Alternatively, it might be asserted that all of what is shown in Figure 3 of Aiello constitutes a single power unit according to the invention. Neither interpretation of what is shown in Figure 3 of Aiello can meet the limitations of claims 20 and 21. Therefore, Aiello's Figure 3 cannot anticipate either claim.

Turning to claim 20, if a unit is carved from Figure 3 of Aiello including only the transformer 41, then it is apparent that there is no input transformer group as in claim 20 in which a primary winding receives all phases of a polyphase AC power supply. The transformers 41, 42, and 43 of Aiello receive only two phases of a three-phase power supply. Accordingly, the identity required for anticipation is not present.

If all three transformers of Figure 3 of Aiello are considered together as an input transformer group, then it is clear that the single input transformer of claim 20 is not present in Figure 3 of Aiello. Even if those transformers 41, 42, and 43 of Aiello are considered to be united as a single input transformer, it is still apparent that the number of power cells in the power unit would be 9, not the same number (3) as the number of phases of the load, the three-phase motor 44, of Aiello. Therefore, no matter how interpreted, the structure of Aiello's Figure 3 cannot provide an identity with regard to claim 20 or any of its dependent claims, claims 2-6 and 11-19.

Turning to claim 21, if only transformer 41 is considered as part of a power unit in Figure 3 of Aiello, then it is apparent that the input transformer group of claim 21, including multiple primary windings with each primary winding receiving all phases of the polyphase power supply, is missing from the structure of Aiello. If the three transformers 41, 42, and 43 of Aiello's Figure 3 are considered to be input transformers according to claim 21, then it is apparent that each of those transformers fails to receive at its primary winding all three phases of the power supply. Further, the resulting power unit includes nine power cells, not the three power cells needed to meet the limitation of

claim 21, which requires equality between the number of power cells and the number of phases of the polyphase AC load. It follows that Aiello cannot anticipate any of the claims that depend from claim 21, namely claims 22-25.

Although not discussed separately above, Figure 8 of Aiello is no more similar to the claimed invention than is the structure shown in Figure 3 of Aiello.

Further comment on the examined claims rejected as anticipated is not necessary. It is, however, emphasized that Aiello never describes an element corresponding to the power unit of the pending claims, only power cells. These two different kinds of elements must be distinguished in properly examining the claims. Further, with respect to the rejection of examined claim 14, it was asserted at page 6 of the Office Action that as many "power cells" can be integrated into a single unit as desired based upon a passage appearing at column 2, lines 28-35 of Aiello. No such disclosure appears in that part of the Summary of the Invention section of Aiello. Rather, reference is made there to "switching cells", neither power cells nor power units. The remainder of the rejection of claim 14 is simply an assertion without factual support and cannot be properly maintained, even without giving consideration to the differences between the claims examined and the claims now presented.

Claims 6, 9, 10, and 19 were rejected as unpatentable over Aiello in view of Salmon (U.S. Patent 5,936,855). This rejection is respectfully traversed.

It is apparent that the rejection of examined dependent claims 6, 9, 10, and 19 is founded upon the assertion that Aiello anticipated claim 1 from which claims 6, 9, 10, and 19 directly or indirectly depended. However, there is no such anticipation and Salmon was not cited as disclosing the parts of the claims presented here that are missing from Aiello. Therefore, further comment on the rejection of these four dependent claims is neither necessary nor supplied. The rejection cannot properly be maintained upon withdrawal of the rejection for anticipation based upon Aiello.

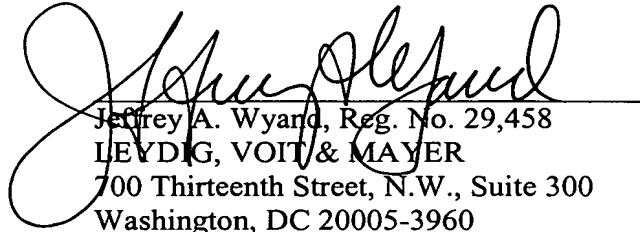
The rejections with regard to claims 9 and 10 discussed at pages 8 and 9 of the Office Action are especially traversed. The Examiner is requested to give particular attention to the star and delta connection arrangements as claimed. Applicants do not assert that they have invented star and delta connections in polyphase transformers.

Contrary to the assertion of the Office Action, while Aiello refers to or at least shows schematic symbols indicating delta and star connections, there is no description of providing both kinds connections at respective sets of secondary windings of the same transformer as in the invention. What is shown in Figure 1 of Aiello in this regard is never explained in Aiello and is impossible to understand from the schematic drawing of Aiello. At best, the secondary windings of the master transformer 2 may, with respect to some groups of power cells, have delta connections and some may have complex connection structures based upon the delta connection for other groups of power cells. The description with regard to Figures 10a-10h of Aiello has no relationship to the claimed invention and never shows a combination of delta and star connections at respective sets of secondary windings of the same transformer. Those figures show “respective output transformer secondary phase arrangements”, which is not what was nor what is claimed in claims 9 and 10. Applicants respectfully request, with respect to all claims, careful attention to the specific claimed subject matter.

Other dependent claims were similarly rejected. Claim 15 was rejected as unpatentable over Aiello in view of Nagashima et al. (U.S. Patent 6,219,245) and claim 17 was rejected as unpatentable over Aiello in view of Geis et al. (U.S. Patent 5,903,116). Since neither Nagashima nor Geis, like Salmon, was cited as potentially supplying any part of the claimed invention not present in Aiello, the rejections of those claims are likewise erroneous because they are founded upon the rejection for anticipation by Aiello. These rejections cannot properly be maintained. Therefore, no further comment is needed nor presented with respect to the rejections of claims 15 and 17, which are clearly patentable upon the allowance of claim 20.

Reconsideration and allowance of all claims now pending are earnestly solicited.

Respectfully submitted,


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Date: May 1, 2006
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